RESOLUTION NO. 22-278

A RESOLUTION OF THE CITY COMMISSION OF THE CITY OF KEY WEST (CITY) APPROVING A CHANGE ORDER IN THE AMOUNT OF $40,446.34 FOR ADDITIONAL WORK NECESSARY FOR INSTALLATION OF THE VFD FOR EFFLUENT PUMP NO. 1, UNDER THE CONTRACT AWARDED TO D.N. HIGGINS, INC. IN RESOLUTION 20-048; AUTHORIZING ANY NECESSARY BUDGET TRANSFERS AND AMENDMENTS; AUTHORIZING THE CITY MANAGER TO EXECUTE NECESSARY DOCUMENTS UPON ADVICE AND CONSENT OF THE CITY ATTORNEY; PROVIDING FOR AN EFFECTIVE DATE

WHEREAS, in Resolution No. 20-048 a contract was awarded to D.N. Higgins, Inc. for replacement of the VFD for effluent pump no. 1, and related tasks; and

WHEREAS, additional work related to utility feeds, wiring and conduit window(s) were not addressed in engineered drawings, and therefore not included in D.N. Higgins proposal, but are necessary to complete the installation of the VFD; and

WHEREAS, Section 2-845(a) of the Code of ordinances requires City Commission approval of any change order in excess of five percent of the contract price on any capital improvement project; and

NOW, THEREFORE, BE IT RESOLVED BY CITY COMMISSION OF THE CITY OF KEY WEST, AS FOLLOWS:

Section 1: That the attached Change Order in the amount of $40,446.34 for additional work, under the contract awarded to D.N. Higgins, Inc. in Resolution 20-048, is hereby approved.

Section 2: That funds for this change order will be used from account #401-3504-535-6500, Project #SE35041902. A transfer of up to $21,471.01 from Reserve Account #401-3501-535-9900, and any other necessary budget transfers or amendments are hereby authorized.

Section 3: That the City Manager is authorized to execute documents related to this Change Order, upon the advice and consent of the City Attorney.

Section 4: That this Resolution shall go into effect immediately upon its passage and adoption and authentication by the signature of the Presiding Officer and the Clerk of the Commission.

Passed and adopted by the City Commission at a meeting

held this 6th day of December, 2022.

Authenticated by the Presiding Officer and Clerk of the Commission on 7th day of December, 2022.

Filed with the Clerk on December 7, 2022.

Mayor Teri Johnston	Yes
Vice Mayor Sam Kaufman	Yes
Commissioner Lissette Carey	Yes
Commissioner Mary Lou Hoover	Yes
Commissioner Clayton Lopez	Yes
Commissioner Billy Wardlow	Yes
Commissioner Jimmy Weekley	Yes

TERI JOHNSTON, MAYOR

ATTEST:

CHERYL SMITH, CITY CLERK

THE CITY OF KEY WEST
Post Office Box 1409 Key West, FL 33041-1409 (305) 809-3700

EXECUTIVE SUMMARY

Date: August 3, 2022

To: Patti McLauchlin, City Manager

CC: Kelly Crowe, Utilities Director

From: Ian McDowell, Associate Engineer

Subject: Approve change order proposal from D.N. Higgins, Inc. for the install of the effluent pump no. 1 VFD at the Richard A. Heyman Environmental Protection Facility.

Action Statement

This resolution would approve a change order proposal from D.N. Higgins, Inc. for the install of an owner provided Variable Frequency Drive (VFD) at the Richard A. Heyman Environmental Protection Facility (RAHEPF) in the amount of $40,446.34 and authorize the city manager to execute any necessary budget transfers/amendments.

Background

In March of 2020, Resolution 20-048 awarded a construction contract in the amount of $246,611.32 to D.N. Higgins for a project to replace the VFD for effluent pump No. 1, VFD transformer, and programmable logic controller (PLC) for all effluent pumps. City staff procured a VFD for effluent pump No. 1 separately in early 2019, reducing costs by $10,200. Due to lead times on certain materials, as well as the introduction of COVID-19, construction did not begin until October of 2020. Installation of the replacement PLC was finished in February.

As the ITB for the third effluent pump and HVAC system was advertised in February, staff decided to delay installation of the VFD for effluent pump No. 1 until the third effluent pump was operational for the purpose of redundancy. Effluent pump No. 3 became operational in March 2022. With effluent pump No. 3 operational, staff began coordinating with D.N. Higgins on scheduling on the installation of the VFD for effluent pump No. 1.

A site visit by the D.N. Higgins sub-contractor prior to the installation of the VFD for Effluent Pump No. 1 uncovered several issues that necessitate additional work. It

was discovered that the utility feeds running to the existing isolation transformer are too short for the new pulse transformer. Additionally, the existing wiring between the transformer and VFD cannot be reused, as the specifications for the new VFD are different. Lastly, the existing conduit arrangement is not compatible with the conduit window for the new VFD, requiring a portion of the conduit to be re-worked. These items were not addressed in the engineered drawings, so they were not included as part of D.N. Higgins' original proposal. D.N. Higgins is requesting a change order in the amount of $40,446.34 for the additional work required to complete the installation of the VFD.

Purpose and Justification

The additional work is needed to complete the installation of the VFD for effluent pump No. 1, which is a critical piece of the RAHEPF's equipment. Replacement is crucial to maintaining resiliency of the system. Staff has reviewed the change order request and finds the amount reasonable.

Financial

The change order in the amount of $40,446.34 will be funded through Account 401-3504-535-6500, Project SE35041902. The account currently has $18,975.33 available and will need funds in the amount of $21,471.01 transferred from reserve account 401-3501-535-9900 to cover the cost of the change order.

Recommendation

City staff recommends approving the change order from D.N. Higgins, Inc. for the additional installation work for the effluent pump VFD pursuant to code of ordinances 2-797 4(b) in the amount of $40,446.34.

Key to the Caribbean – average yearly temperature 77 ° Fahrenheit.

HIGGINS, INC. ann arbor, mi
GENERAL CONTRACTORS

CORPORATE OFFICE
3390 TRAVIS POINTE RD, SUITE A
ANN ARBOR, MI 48108
(313) 996-9500, FAX: (313) 996-8480

REGIONAL OFFICE
4485 Enterprise Ave
Naples, FL 34104
(239) 774-3130

PROPOSAL

General Services Contract

TO: City of Key West
P.O. Box 1409
Key West, FL 33040
Attn. Ian McDowell

JOB NAME: VFD FP-3-1 KW Sewer Plant

DATE: July 28, 2022

Original Scope: Demo & remove existing VFD & Tranformer, install new VFD & Tranformer (owner supplied) and provide & install new FP-3-1 control panel
* This proposal is comprised of additional material, labor and supervision due to unforeseen conditions. See attached for details

QUANTITY	UNIT	DESCRIPTION	PRICE	AMOUNT
		Additional Work to Install Transformer & VFD		
10	HR	Superintendent	$ 95.00	$ 950.00
122	HR	Electrician Plus 5% markup	$ 95.88	$ 11,696.86
1	LS	Material, terminal block, wire, conduit, hanger, fasters etc. cost plus 15 %	$ 14,503.42	$ 14,530.42
1	LS	Travel time, room & board	$ 10,661.94	$ 10,661.94
		Subtotal - Cost of Construction		
		Additional Scope of Work Due to Unforeseen Conditions		
		Subtotal - Cost of Construction		$ 37,839.22
		Bond $18.00 Per $1,000.00		$ 681.11
		Subtotal - Cost of Construction		$ 38,520.33
		GCs, Mobilization / Demobilization and MOT at 5%		$ 1,926.02
		TOTAL PRICE		$ 40,446.34

Gulf States Electric, LLC.

5933 Youngquist Rd
Ft Myers, FL 33912
State Certified EC 13003707
Industrial Electrical Contractor

Phone (239) 263-7137

July 15, 2022

Key West VFD Replacement

Additional Unforeseen Conditions

Douglas N. Higgins, Inc.
Attn. Mike LoBello

I have prepared a proposal to complete additional work needed to install the new VFD and Pulse Transformer. See attached documentation with explanation.

1) The existing feeders from the electric room to the existing iso transformer are not long enough. See pic#1
   a. Advised solution would be to install a terminal block in the new pulse transformer. See pic#2
   b. Note* If a terminal block is not acceptable then we will have to replace the feeders (very expensive).

2) We cannot reuse the wire from the existing iso. transformer to the existing VFD because the new pulse transformer feeds the new VFD through four high stranded 1000 volt DC cable. Factory cables are not long enough.
   a. Solution, we are going to have to purchase new 1000v DC Cable. See pic#3

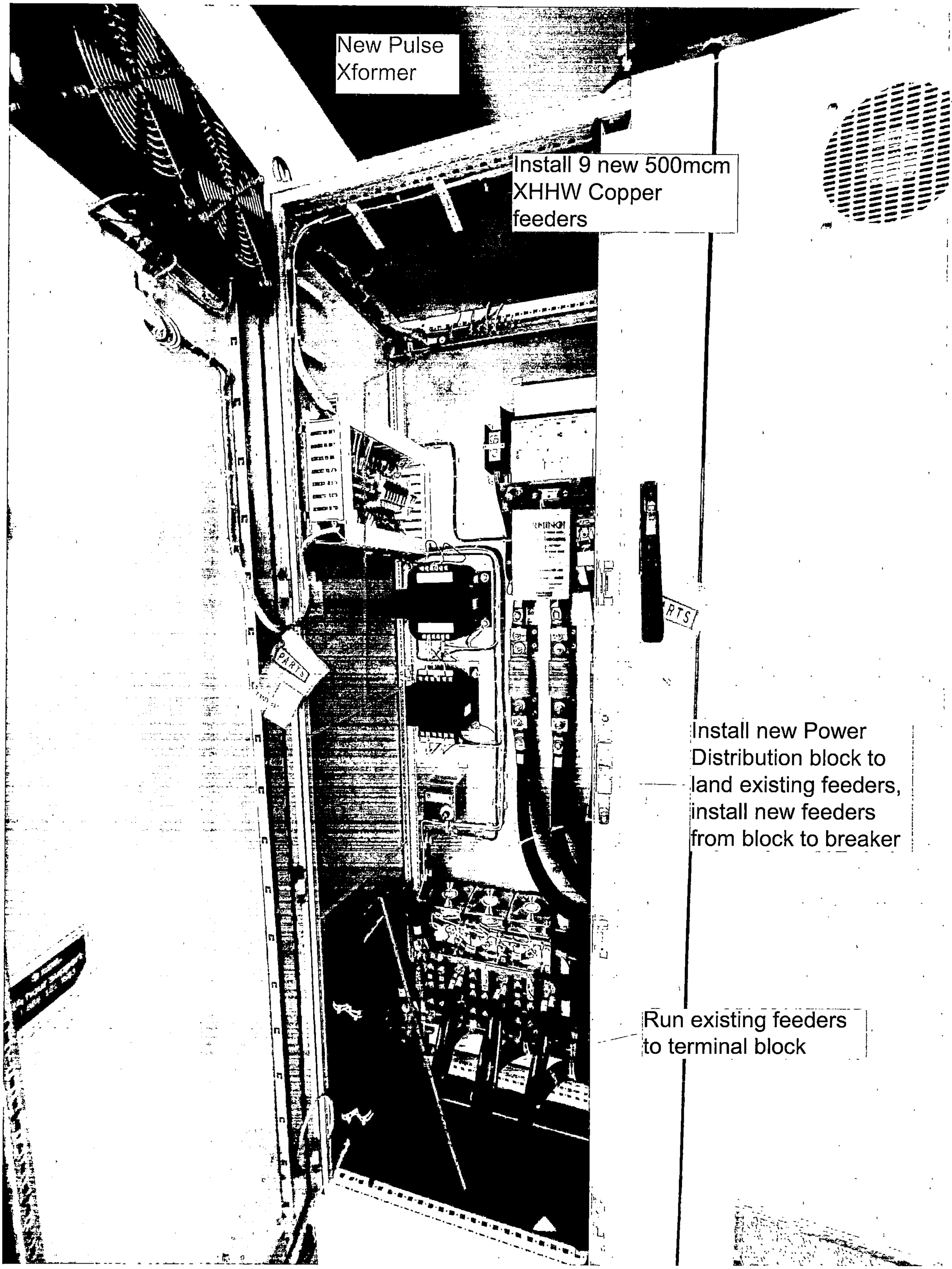
3) The conduit arrangement above the existing VFD will not fit in the new VFD window. See pic#4
   a. Solution, cut the conduit close to the ceiling and install grounding bushing and free wire to the new VFD window. (as done previously) We will have to install "C" condilets to accommodate pulling wire back. See pic#5

$12,635.15	Material
$11,139.87	Labor
$10,661.94	Travel Time, Room, & Board
$34,436.96	TOTAL

Thank you for your time and consideration, please call me if you have any questions regarding this quotation.

Brad Hamm
Estimator/Project Manager
Gulf States Electric, Inc.
239-263-7137 x 201

Existing feeders from electric room to new Iso. Xformer are not long enough to land in the new Pulse Transformer

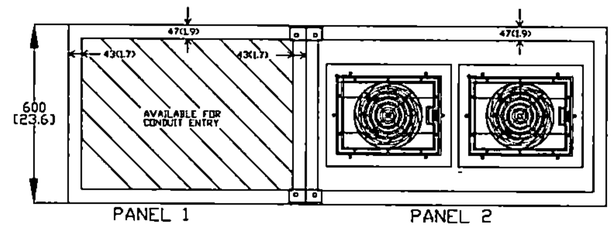

New Pulse Xformer
Install 9 new 500mcm XHHW Copper feeders
Install new Power Distribution block to land existing feeders, install new feeders from block to breaker
Run existing feeders to terminal block

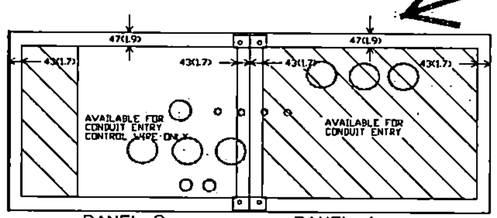
Factory DC high voltage cable, intended to be installed from Pulse Xformer to New VFD, but it is not long enough.

EFFLUENT PUMP P-6-2-1

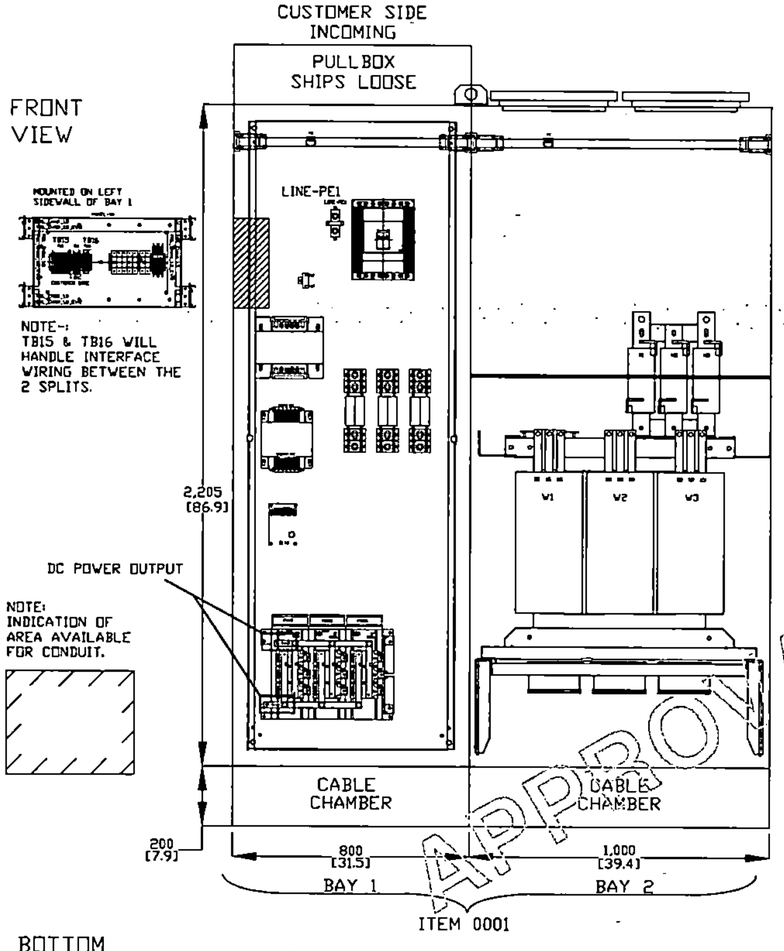
Existing conduit layout will not fit into new conduit window

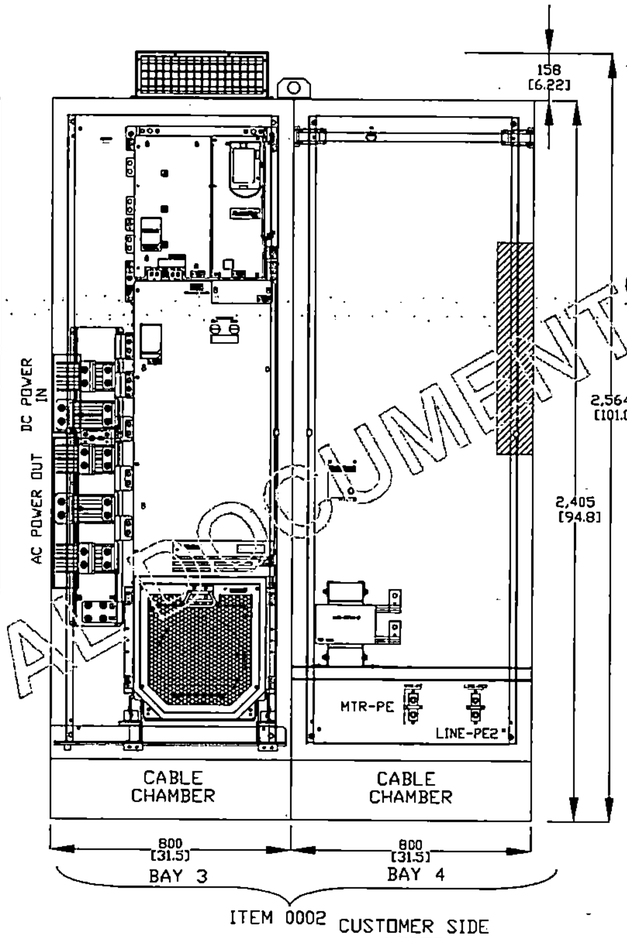
TOP VIEW

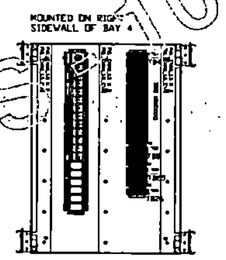




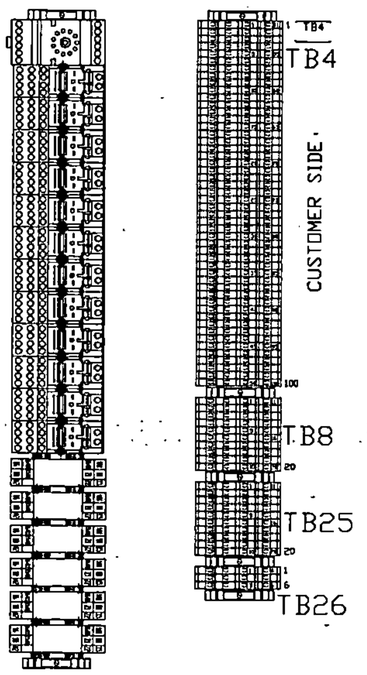
FRONT VIEW



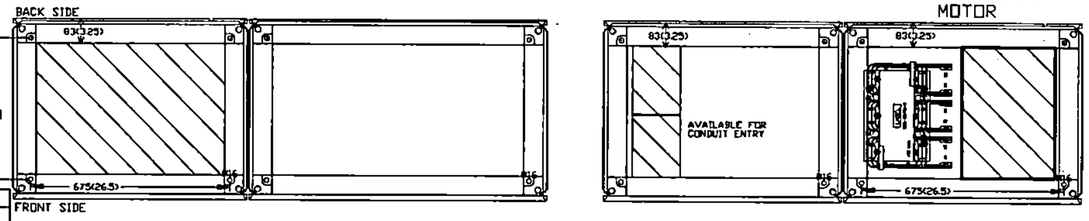




TB15, TB16, / TB4, TB25, TB26, TR, CR AND FUSE DETAIL



BOTTOM VIEW



DATE	BY	APPROVAL
05/02/19	JN	DESIGN REVIEW
		FOR MANUFACTURING
		AS SHIPPED
		AS COMMISSIONED

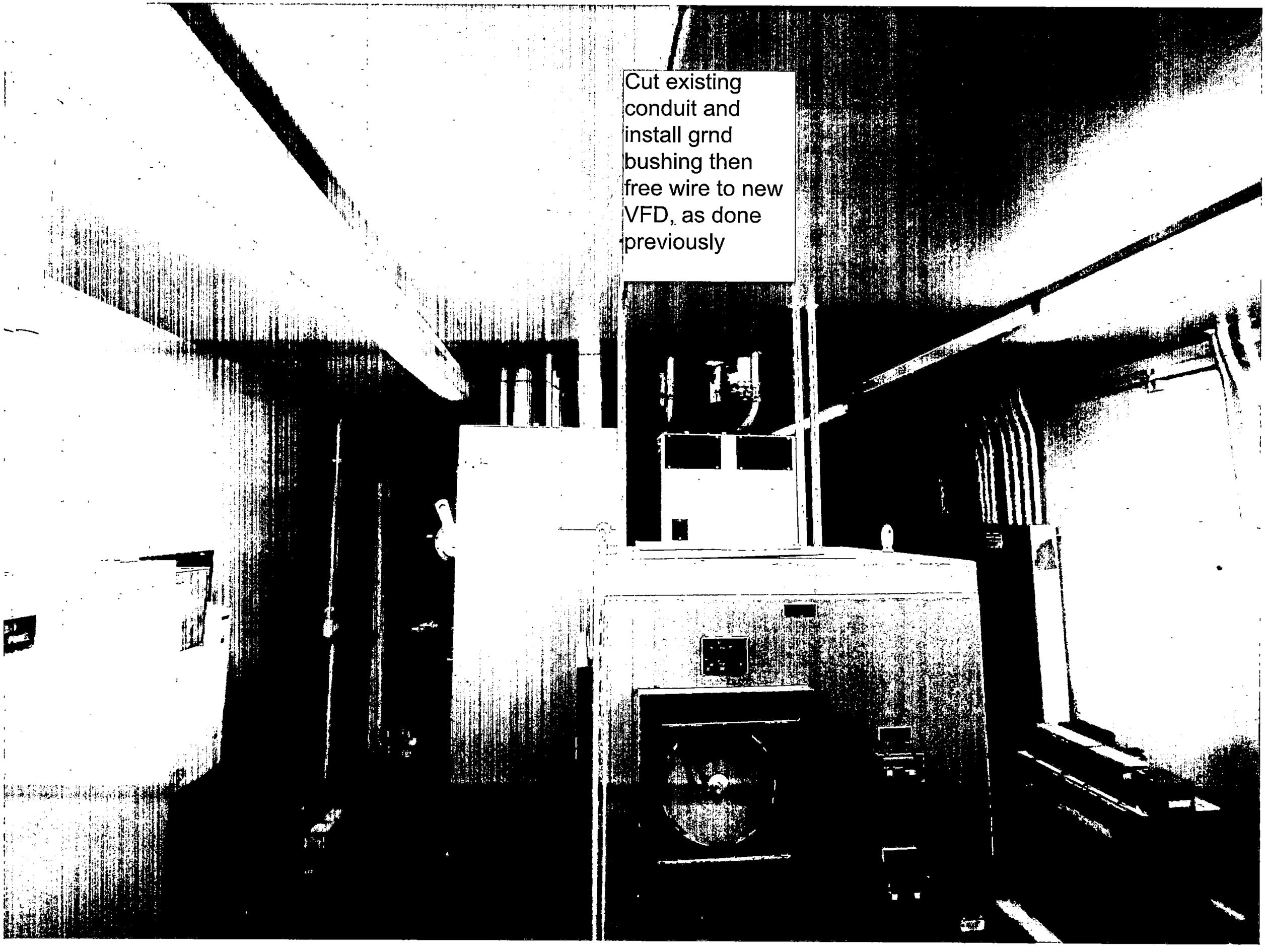
REV.	DATE	BY	ECN/CR. NO.
A	05/02/19	JN	FOR APPROV.
B	09/27/19	JN	FOR APPROV.

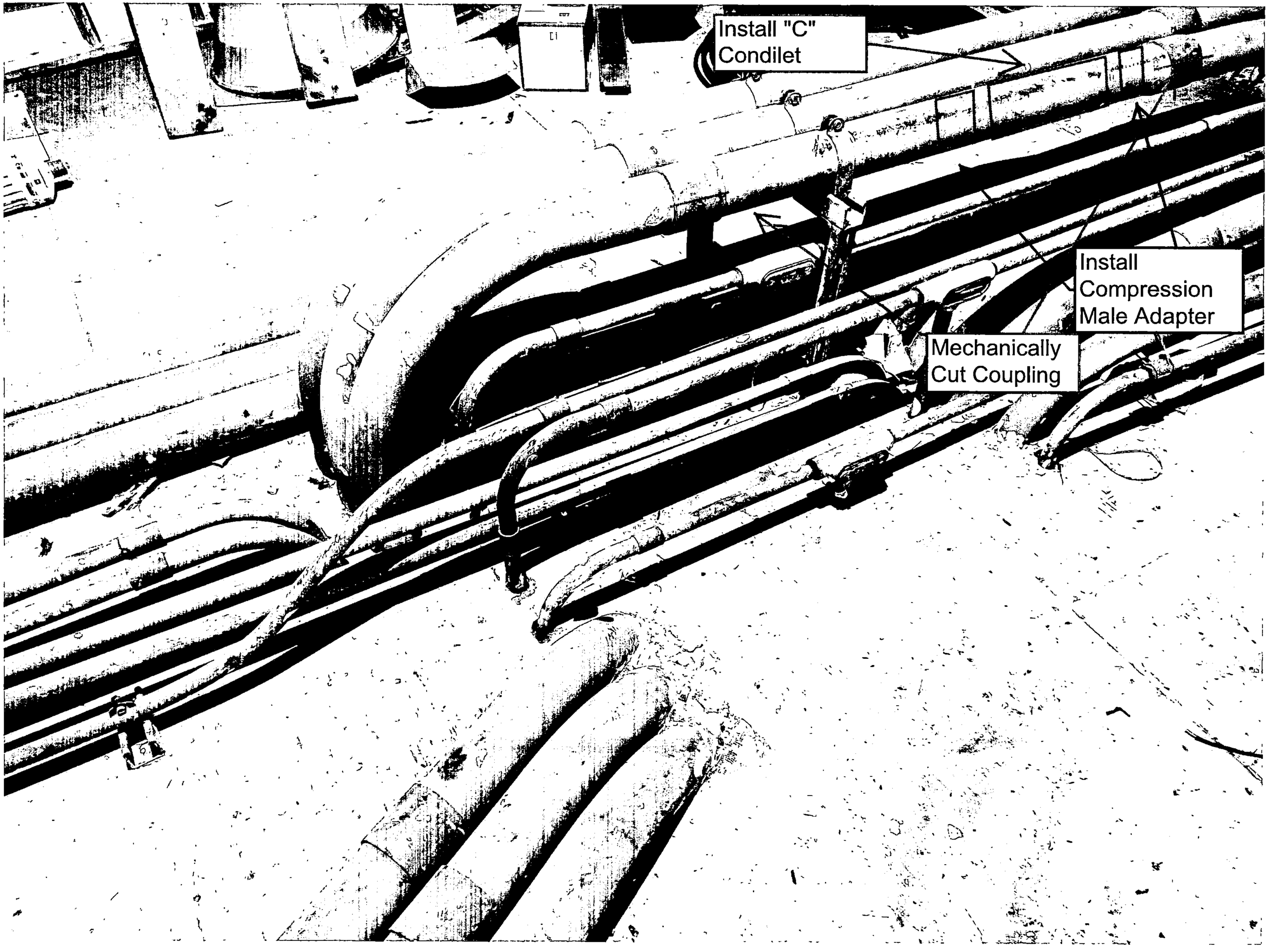
Rockwell Automation

DIMENSION DRAWING
ITEM 0001
EFFLUENT PUMP P-6-2-1
Drawn by: PS | Date: 4/4/19

Sheet D0002 Of D0003 Next Sh D0003

Size D | DS-P1USXC0142-0001 | Ver –


Cut existing conduit and install grnd bushing then free wire to new VFD, as done previously


Install "C"
Condilet
Install
Compression
Male Adapter
Mechanically
Cut Coupling

Job ID: JOB-0105
Project: Key West VFD Additions

IntelliBid

Bid Summary Report

Vendor: TRADE/3-COL **Labor Level:** LABOR 3 **15 Jul 2022 11:00:53**

Tax Rate status: Bid **Bid Name:** BASE BID **Bid Template:** GSE

Drawing	Phase	Quote $	Material $	Equip $	SubCon $	Labor Hrs
	HVAC & MOTORS	0.00	8,108.55	0.00	0.00	101.66
	CABLE TRAY	3,700.00	0.00	0.00	0.00	0.00
	Sheet Totals:	3,700.00	8,108.55	0.00	0.00	101.66
	Tax:	259.00	567.60	0.00	0.00	
				Sub Total (Quo/Mat/Equip/Sub):	11,808.55	
				Sales Tax:	826.60	
				Sub Total:	12,635.15	12,635.15

Bid Notes:

TAX RATES

Material:	7.0000%
Quote:	7.0000%
Labor:	0.0000%
Equipment:	7.0000%
Subcontract:	0.0000%
Job:	0.0000%

MISCELLANEOUS

Avg. Lbr. Rate (Cost):	78.78
Avg. Lbr. Rate (Bid):	86.66
Total Square Feet:	1.00
Cost Per Sq. Ft.:	34,436.97
Labor $ Per Sq. Ft.:	8,009.24
Labor Hrs Per Sq. Ft.:	101.66
Quantity of Units:	1.00
Cost Per Unit:	34,436.97
Calc. Adjustment:	0.00%

Direct Labor $:	8,009.24
Indirect Labor $:	1,983.36
Labor Escalation:	0.00
Labor Tax:	0.00
Direct Job Costs (25.20%):	8,678.58
Prime Cost:	31,306.34
Overhead (Avg. 0.00%):	0.00
Net Cost:	31,306.34
Profit (Avg. 10.00%):	3,130.63
Job Tax:	0.00
Bond (0.0000%):	0.00
Lump Sum:	0.00
Selling Price:	34,436.97

Job ID: JOB-0105
Project: Key West VFD Additions

IntelliBid

Bid Subtotal Report

Vendor: TRADE/3-COL **Labor Level:** LABOR 3 **15 Jul 2022 11:02:22**

Tax Rate status: Bid **Bid Name:** BASE BID **Bid Template:** GSE

Subtotal	Material	M-Factor	Mat Result	Labor	L-Factor	Labor Result	Quote	Q-Factor	Quote Result
RIGID FITTINGS	2,436.80	1.0000	2,436.80	46.38	1.0000	46.38	0.00	1.0000	0.00
HANGERS/SUPPORTS	87.29	1.0000	87.29	3.60	1.0000	3.60	0.00	1.0000	0.00
LIQUIDTITE	120.00	1.0000	120.00	3.60	1.0000	3.60	0.00	1.0000	0.00
XHHW CU	3,010.45	1.0000	3,010.45	6.48	1.0000	6.48	0.00	1.0000	0.00
5/15KV CABLE	0.00	1.0000	0.00	9.00	1.0000	9.00	0.00	1.0000	0.00
WIRE TERMINATIONS	320.00	1.0000	320.00	4.00	1.0000	4.00	0.00	1.0000	0.00
MISCELLANEOUS ITEMS	1,794.02	1.0000	1,794.02	25.00	1.0000	25.00	0.00	1.0000	0.00
FLEX COND FITTINGS	340.00	1.0000	340.00	3.60	1.0000	3.60	0.00	1.0000	0.00
			8,108.55			**101.66**			**0.00**

Gulf States Electric, Inc.
4585 Progress Ave. Suite #2
Naples, FL 34104
Phone: 239-263-7137
Web:

NOTE:

[1] INSTALL CONDUIT ON TRAPEZ HANGERS
1-5/8 STAINLESS STRUT W/ 3/8 STAINLESS STEEL
ALL THREAD AND HARDWARE
VERIFY ROUTING IN FIELD W/ OWNER.

[2] INSTALL NEWS CAT 6 IN TJB FROM CONTROL
ROOM TJB TO FP-2-1 TJB.

[A] 2" PVC COATED RIGID STEEL
W/ CAT 6 BELDON CABLE SHIELDED.
LEAVE 5 FEET FREE LENGTH OF
CONDUCTOR EACH END.
PROVIDE TERMINATIONS ON ALL ENDS
TO COMPLETE CAT 6 INSTALLATIONS.

CHARTS
FP3-1A
VFD
VFD
[A]
TJB
FP-3
TJB 2 [2]
FP-2-1
FP-3-1
[A]
EFFLUENT PUMPS
CONTROL CENTER
[A]
FP-12-1-B
FP-12-1-A
MOTOR CONTROL CENTER
TJB
COMM
ROOM
SCADA

CONTROL
ROOM
TJB
[A]
TJB-2
FP-2-1
EXISTING
FP 3-1
[A]
NEW
TJB-1
FP 3-1
[A]
EXISTING
FP 3-1A

RISER DIAGRAM
NTS

FLOOR LAYOUT
NTS

N

NO.	DATE	DSGN	DR	CHK	APVD	BY	APVD
		M. FURDOCK	K. HELDORFER	A. COLLINS			

REVISION

CH2MHILL
5410 5TH STREET
KEY WEST, FLORIDA 33040
PHONE: 305.294.1645
FAX: 305.292.5153

THE RICHARD A. HEYMAN ENVIRONMENTAL
POLLUTION CONTROL FACILITY
CITY OF KEY WEST
KEY WEST, FLORIDA

ELECTRICAL

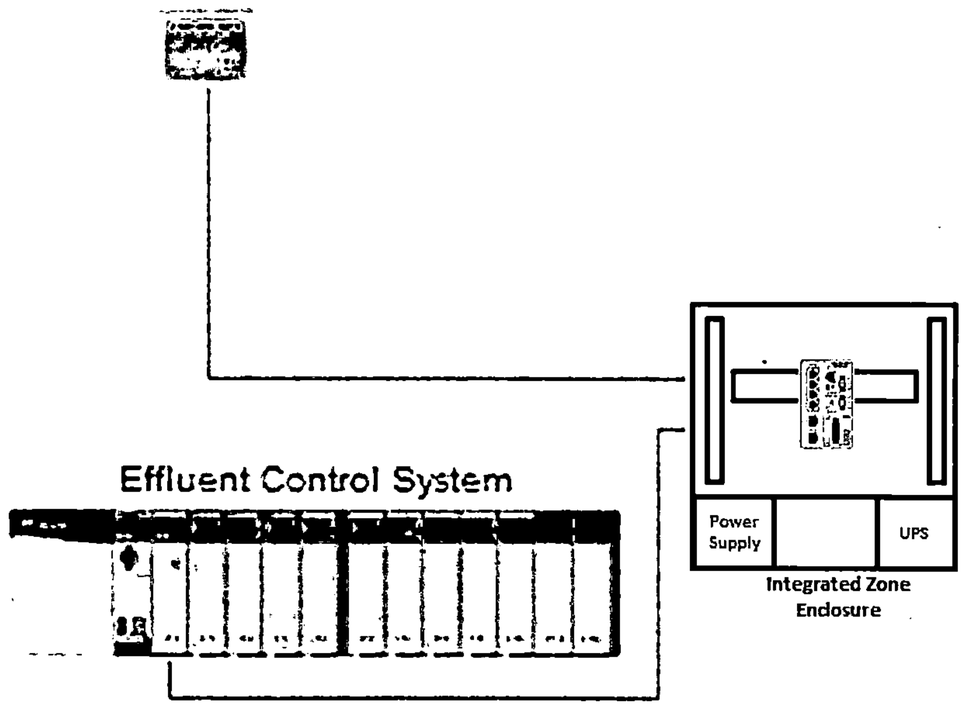
FLOOR LAYOUT
REPLACEMENT OF
EFFLUENT CONTROL PANEL PLC

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	APRIL 2014
PROJ	351255
DWG	E1
SHEET	1 of 4

Preliminary

FILENAME: 422099-ANSI_D.dgn PLOT DATE: 2015\04\14 PLOT TIME: 10:15:47 AM



PANAL FP-3-1
NEW INTERIOR COMPONETS

BILL OF MATERIAL

Qty	Product Hardware	Description
	Effluent Control System	
1	1756-A13	13 Slot ControlLogix Chassis
1	1756-EN2T	EtherNet 10-100M Interface Module (supports 128 TCP/IP connections)
3	1756-IA16	79-132 VAC Input 16 Pts (20 Pin)
2	1756-IF6I	Isolated Analog Input-Current/Voltage 6 Pts (20Pin)
1	1756-L71	ControlLogix5571 Controller With 2 Mbytes Memory
2	1756-N2	Slot Filler
2	1756-OF6CI	Isolated Analog Output - Current 6 Pts (20 Pin)
2	1756-OW16I	N.O. Isolated Relay Output 16 Pts (36 Pin)
1	1756-PA75	85-265 VAC Power Supply (13 Amp @ 5V)
2	1756-TBCH	36 Pin Screw Clamp Block With Standard Housing
7	1756-TBNH	20 Position NEMA Screw Clamp Block
	Effluent PV+ 6 1000	
1	2711P-T10C4A8	2711 PanelView Plus 6 Terminal, 1000 Model, Touch Screen, Color, - Ethernet & RS-232, AC Input
	Industrial Zone Enclosure & Hardware for Network Switch	
1	IAZ2424C	Industrial Zone Enclosure 28.0"H x 24.0" W x 11.7"D
1	1783-BMS06SL	Stratix 5700 Switch, Managed, 4 Fast Ethernet Copper Ports, 2 Fast Ethernet Fiber SFP Slots, Lite Software
1	1606-XLP15E	1606-XLP15E: Compact Power Supply, 24-28V DC, 15 W, 120/240V AC / 85-375V DC Input Voltage
1	1606-XLS240-UPS	1606-XLS240-UPS: Performance Power Supply w/ UPS, 22.5-30V DC, 240W, 22.5-30V DC Input Voltage
1	1606-XLSBATASSY1	7.5Ah Battery Assembly w/ Mounting Bracket

NOTE:

1. PROVIDE 25% SPARE TERMINALS
2. PROVIDE 3 SPARE ANNALOG OUTPUT / INPUT CARDS AND 3 SPARE SLOTS FOR EACH.
3. PROVIDE 3 DISCRETE SIGNAL CARDS AND SPARE SLOTS.
4. PROVIDE LINE SIDE SURGE ARRESTOR AS RECOMMAND BY CONTROL PANEL VENDOR EDCO OR EQUAL.
5. PROVIDE ONE SPARE SURAGE ARRESTOR.

NO.	DATE	REVISION	BY	APVD
DSGN	M. FURDOCK	DR K. HELDORFER	CHK A. COLLINS	APVD

CH2MHILL®
5410 5' STREET
KEY WEST, FLORIDA 33040
PHONE: 305.294.1845
FAX: 305.292.5130

THE RICHARD A. HEYMAN ENVIRONMENTAL POLLUTION CONTROL FACILITY
CITY OF KEY WEST
KEY WEST, FLORIDA

ELECTRICAL

DETAILS / BILL OF MATERIAL
REPLACEMENT OF
EFFLUENT CONTROL PANEL PLC

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	APRIL 2014
PROJ	351255
DWG	E2
SHEET	2 of 4

Preliminary

LOOP DESCRIPTIONS

Loop One

Effluent Wet Well Level control

Measure level through existing bubbler system control effluent pumps P-X-X-X based on set point table as shown on drawings. Display graphically and digitally set points, alarms and levels of effluent wet well and effluent wet well pumps P-X-X-1,2,3. Normal operation shall be one selected pump with rotations of pumps to occur at midnight each day. Only one pump shall run in auto for normal operations. However, if primary pump should fail it shall be locked out in alarm condition and next pump in sequence shall start automatically, if in the Auto position. Graphically display speed set points and actual speed of P-X-1,2,3.

Graphically Display all existing alarm functions for pumps P-X-1,2,3 including all alarms currently displayed in existing annunciator. Existing Annunciator to remain and shall be interfaces with all loops

X= FP-6-2-1, FP-6-2-2, FP-6-2-3 (future see note 1 on sheet E4).

Loop Two

Deep Injection Wells 1,2

Display Graphically Deep Injection Wells (DIW) one and two functions, alarms analog and discrete signals. Display discrete signals open/ close for all valves DIW 1 & 2 including fail to open or close and fail from existing limit switch. Display shall be included in New Panel View, on new screen in existing SCADA system, and existing annunciator located in FP-3-1.

Display Graphically Deep Injection Wells (DIW) 1 & 2 flow and pressure values, functions, alarms analog and discrete signals. Include in control logic the signals currently in FP-3-1 , FP3-1A and existing SCADA system and display graphically and digitally all values in all three locations.

Loop Three

Monitor Wells

Display Graphically and digitlly Monitor well 1 & 2 all monitor well values for upper and lower zones including pressure indication and recording of values for both zones and display graphically in newel View and existing SCADA system.

Loop Four

SCADA interfacing of Wet Well, Deep Injection Well and Monitor Well

All values included in existing system for loops 1,2,3 above, existing FP-3-1, FP-3-1A , existing annunicator in FP-3-1 shall be included and displayed on new graphic screens showing process flow, alarms, values , trending of all values . Screens shall include a overview of the entire system, an individual screen for Effluent Level and Pump Control, Deep Injection Well, Monitor Wells , Alarm status screen and a trending screen based on a 24 hour 7 day value for each system as well as an overall trend for all values for entire system.

* ALL EXISTING I/O TO BE FIELD VERIFIED AND A RECORD DRAWING OF ALL NEW AND EXISTING SHALL BE PROVIDED BY CONTRACTOR.

FP-3-1 PLC INPUT / OUTPUT MAP

DIGITAL OUTPUT CARD #3

Pt. #	Type	Address	Description	Terminal #	Source	
1	DO	0503-01	#1 Pump RUN	31, 32	#1 VFD Panel	
2	DO	0503-02	#2 Pump RUN	33, 34	#2 VFD Panel	
3	DO	0503-03	#1 Limitorque Valve OPEN	35 ,36	Limitorque Actuator	
4	DO	0503-04	#1 Limitorque Valve CLOSE	37, 38	Limitorque Actuator	
5	DO	0503-05	#2 Limitorque Valve OPEN	39, 40	Limitorque Actuator	Jumper to PT#6
6	DO	0503-06	#2 Limitorque Valve CLOSE	41, 42	Limitorque Actuator	Jumper to PT#5
7	DO	0503-07	UNUSED IN PLC PROGRAM	43, 44		
8	DO	0503-08	UNUSED IN PLC PROGRAM	45, 46		
9	DO	0503-09	UNUSED IN PLC PROGRAM	47, 48		
10	DO	0503-10	PLC Fail	H1, N1	Relay CR-10 and Yellow Light	
11	DO	0503-11	#1 VFD PLC Fails	2, H2A	Relay CR-2 and Yellow light	
12	DO	0503-12	spare	51, 52	spare	
13	DO	0503-13	#1 Seal Water Solenoid OPEN	53, 54	CR-15	Relay
14	DO	0503-14	#2 Seal Water Solenoid OPEN	55, 56	Solenoid	
15	DO	0503-15	PLC Reset Output	57, 58		
16	DO	0503-16	#2 VFD PLC Fails	59, 60	Relay CR-6 and Yellow Light	

ANALOG INPUT CARD #4

Pt. #	Type	Address	Description	Terminal #	Source	
1	AI	504	#1 VFD Speed Input	1	#1 VFD Panel	
2	AI	505	#2 VFD Speed Input	2	#2 VFD Panel	
3	AI	506	#1 Wetwell Level Transmitter	3	Bubbler Panel	
4	AI	507	None	4		

ANALOG INPUT CARD #5

Pt. #	Type	Address	Description	Terminal #	Source	
1	AI	508	#2 Wetwell Level Transmitter	1	Bubbler Panel	
2	AI	509	None	2		
3	AI	510	None	3		
4	AI	511	None	4		

ANALOG OUTPUT CARD #6

Pt. #	Type	Address	Description	Terminal #	Destination	
1	AO	512	#1 VFD Speed Input	1	#1 VFD Panel	
2	AO	513	#2 VFD Speed Input	2	#2 VFD Panel	
3	AO	514	Wetwell Level	3	FP-12-1 - to Telemetry RTU	
4	AO	515	VFD Speed Common Output	4	FP-12-1 - to Telemetry RTU	

ANALOG

Pt. #	Type	Address	Description	Terminal #	Source	
1	A	526	Effluent Flow (deep well Venturi meter)		FP-2-1	
2	A	527	spare			
3	A	258	spare			
		529	spare			

DIGITAL INPUT CARD # 1

Pt. #	Type	Address	Description	Terminal #	Source	
1	DI	0501-01	Master HOA Switch in AUTO	none	FP-3-1 panel	
2	DI	0501-02	Pump #1 HOA Switch in AUTO	10	FP-3-1 panel	
3	DI	0501-03	Pump #2 HOA Switch in AUTO	11	FP-3-1 panel	
4	DI	0501-04	#1 VFD Running	1	VFD Panel	
5	DI	0501-05	#1 FAIL from VFD or PLC logic	2	VFD Panel or PLC	
6	DI	0501-06	#1 Check Valve failed to open	3	VFD Panel	
7	DI	0501-07	#1 Motor Overtemperature	4	VFD Panel	
8	DI	0501-08	#2 VFD Running	5	VFD Panel	
9	DI	0501-09	#2 FAIL from VFD or PLC logic	6	VFD Panel or PLC	
10	DI	0501-10	#2 Check Valve failed to open	7	VFD Panel	
11	DI	0501-11	#2 Motor Overtemperature	8	VFD Panel	
12	DI	0501-12	UNUSED IN PLC PROGRAM	9	Primer Panel	
13	DI	0501-13	#1 Limitorque Open	12	Limitorque Actuator	
14	DI	0501-14	#1 Limitorque Closed	13	Limitorque Actuator	
15	DI	0501-15	#2 Limitorque Open	14	Limitorque Actuator	
16	DI	0501-16	#2 Limitorque Closed	15	Limitorque Actuator	

DIGITAL INPUT CARD # 2

Pt. #	Type	Address	Description	Terminal #	Source	
1	DI	0502-01	#1 Seal Water ON	16	Pressure Switch	
2	DI	0502-02	#2 Seal Water ON	17	Pressure Switch	
3	DI	0502-03	Alarm Reset Button (normally closed)	none	FP-3-1 panel	
4	DI	0502-04	UNUSED IN PLC PROGRAM	18	Vacuum Primer Panel	
5	DI	0502-05	UNUSED IN PLC PROGRAM	19	FP-2-1?	
6	DI	0502-06	UNUSED IN PLC PROGRAM	20	FP-2-1?	
7	DI	0502-07	UNUSED IN PLC PROGRAM	21	FP-2-1?	
8	DI	0502-08	UNUSED IN PLC PROGRAM	22	Spare	
9	DI	0502-09	UNUSED IN PLC PROGRAM	23		
10	DI	0502-10	UNUSED IN PLC PROGRAM	24		
11	DI	0502-11	UNUSED IN PLC PROGRAM	25		
12	DI	0502-12	UNUSED IN PLC PROGRAM	26		
13	DI	0502-13	UNUSED IN PLC PROGRAM	27		
14	DI	0502-14	UNUSED IN PLC PROGRAM	28		
15	DI	0502-15	Utility Power Available	29		
16	DI	0502-16	UNUSED IN PLC PROGRAM	30		

NO.	DATE	DSGN	DR	CHK	APVD
		M. FURDOCK	K. HELDORFER	A. COLLINS	

REVISION BY APVD

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THE RICHARD A. HEYMAN ENVIRONMENTAL POLLUTION CONTROL FACILITY
CITY OF KEY WEST
KEY WEST, FLORIDA

ELECTRICAL

LOOP DESC. & I/O DIRECTORY
REPLACEMENT OF
EFFLUENT CONTROL PANEL PLC

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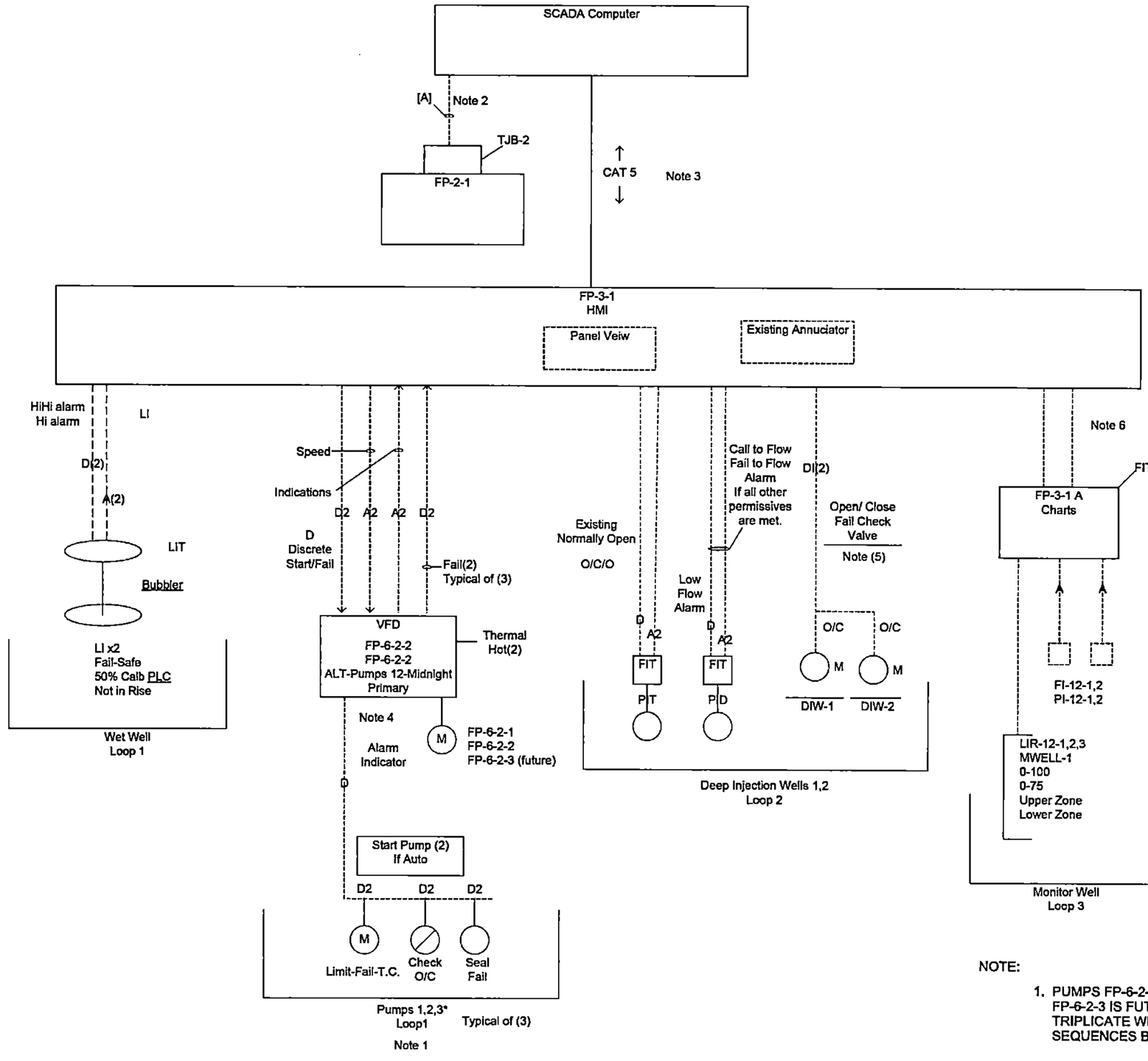
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	APRIL 2014
PROJ	351255
DWG	E3
SHEET	3 of 4

Preliminary

FILENAME: 422099-ANSI_D.dgn PLOT DATE: $PLOTDATE PLOT TIME: $PLOTTIME



Pump Level /Speed Set Points

Level	Depth (ft)	Speed (%)
6th Level	9.00	100
5th Level	8.60	90
4th Level	8.40	83
3rd Level	8.20	80
2nd Level	7.95	76
1st Level	7.75	68

Minimum Speed 66 %

Pump Start 8.50 ft

Pump Stop 6.50 ft

Alarms

Alarm	Set Point (ft)
Lo	4.00
Lo Lo	3.00
Hi	10.50
Hi Hi	10.60

TYPICAL OF (3) NOTE 1

NOTE:

1. PUMPS FP-6-2-1, FP-6-2-2 ARE EXISTING. FP-6-2-3 IS FUTURE, PROVIDE ALL LOGIC IN TRIPLICATE WITH FUTURE FP-6-2-3 OUT OF SEQUENCES BUT READY TO ENABLE.

NO.	DATE	REVISION	BY
DSGN	M. FURDOCK	CHK K. HELDORFER	APVD A. COLLINS
DR		APVD	

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KEY WEST, FLORIDA

ELECTRICAL

I/C FLOW DIAGRAM
REPLACEMENT OF EFFLUENT CONTROL PANEL PLC

VERIFY SCALE
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0 1"

DATE	APRIL 2014
PROJ	351255
DWG	E4
SHEET	4 of 4

Preliminary

FILENAME: 422099-ANSI_D.dgn PLOT DATE: $PLOTDATE PLOT TIME: $PLOTTIME